

DC-Micromotors

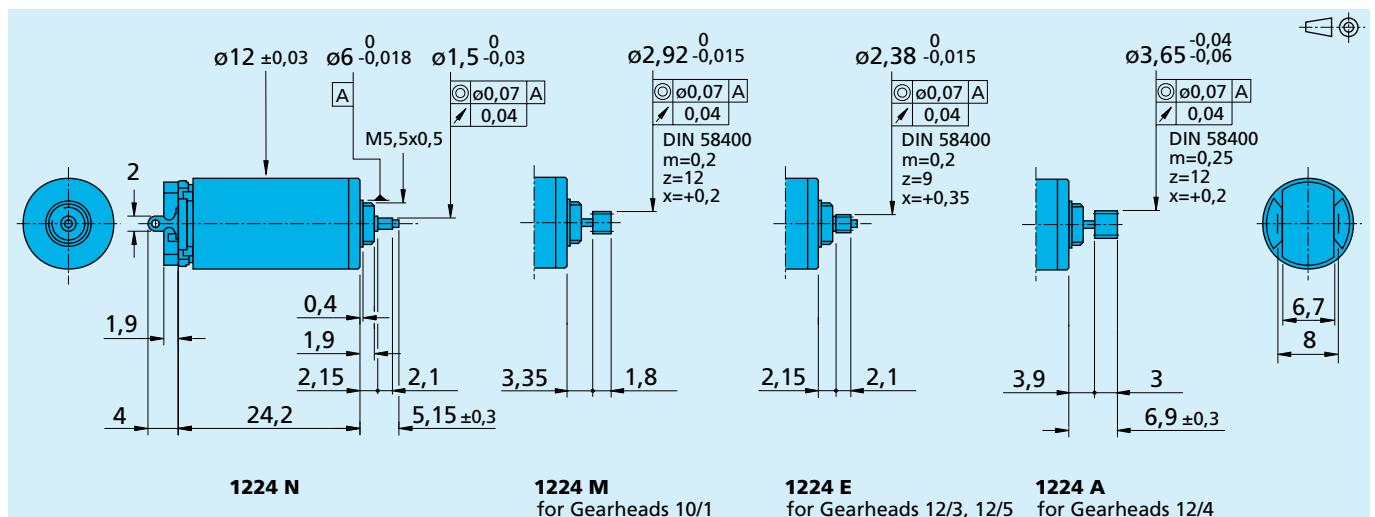
Precious Metal Commutation

1 mNm

For combination with (overview on page 14-15)
 Gearheads:
 10/1, 12/3, 12/4, 12/5
 Encoders:
 30B

Series 1224 ... S

1224 N		006 S	012 S	015 S		
1	Nominal voltage	U _N	6	12	15	Volt
2	Terminal resistance	R	6,6	26,8	42,3	Ω
3	Output power	P _{2 max.}	1,3	1,3	1,3	W
4	Efficiency	η _{max.}	78	78	78	%
5	No-load speed	n _o	12 700	13 100	12 400	rpm
6	No-load current (with shaft ø 1,0 mm)	I _o	0,013	0,006	0,005	A
7	Stall torque	M _H	3,69	3,60	3,62	mNm
8	Friction torque	M _R	0,05	0,05	0,05	mNm
9	Speed constant	k _n	2 318	1 173	923	rpm/V
10	Back-EMF constant	k _E	0,431	0,852	1,084	mV/rpm
11	Torque constant	k _M	4,12	8,14	10,35	mNm/A
12	Current constant	k _I	0,243	0,123	0,097	A/mNm
13	Slope of n-M curve	Δn/ΔM	3 713	3 862	3 771	rpm/mNm
14	Rotor inductance	L	65	250	450	μH
15	Mechanical time constant	τ _m	7	7	7	ms
16	Rotor inertia	J	0,18	0,18	0,18	gcm ²
17	Angular acceleration	α _{max.}	205	200	201	·10 ³ rad/s ²
18	Thermal resistance	R _{th 1} / R _{th 2}	22 / 45			K/W
19	Thermal time constant	τ _{w1} / τ _{w2}	6,5 / 392			s
20	Operating temperature range:					
	– motor		– 30 ... + 85			°C
	– rotor, max. permissible		+ 85			°C
21	Shaft bearings		sintered bronze sleeves			
22	Shaft load max.:					
	– with shaft diameter		1,0			mm
	– radial at 3 000 rpm (1,5 mm from bearing)		0,5			N
	– axial at 3 000 rpm		0,1			N
	– axial at standstill		20			N
23	Shaft play:					
	– radial	≤	0,03			mm
	– axial	≤	0,2			mm
24	Housing material		steel, nickel plated			
25	Weight		13			g
26	Direction of rotation		clockwise, viewed from the front face			
Recommended values - mathematically independent of each other						
27	Speed up to	n _{e max.}	12 000	12 000	12 000	rpm
28	Torque up to	M _{e max.}	1	1	1	mNm
29	Current up to (thermal limits)	I _{e max.}	0,330	0,165	0,130	A



Encoders

Magnetic Encoders

Features:
 10 Lines per revolution
 2 Channels
 Digital output

Series 30B

30B			
Lines per revolution	N	10	
Signal output, square wave		2	channels
Supply voltage	V _{CC}	4,5 ... 5,5	V DC
Current consumption, typical (V _{CC} = 5 V DC)	I _{CC}	5	mA
Pulse width	P	180 ± 45	°e
Phase shift, channel A to B	Φ	90 ± 45	°e
Logic state width	S	90 ± 45	°e
Cycle	C	360 ± 30	°e
Signal rise/fall time, typical	tr/tf	5 / 0,2	µs
Frequency range ¹⁾	f	up to 7,2	kHz
Inertia of code disc	J	0,09	gcm ²
Operating temperature range		- 20 ... + 85	°C

¹⁾ Velocity (rpm) = f (Hz) x 60/N

Ordering information

Encoder type	number of channels	lines per revolution	in combination with DC-Micromotors
30B19	2	10	series 1016, 1024
30B20	2	10	series 1219, 1224
30B18	2	10	series 1336

Features

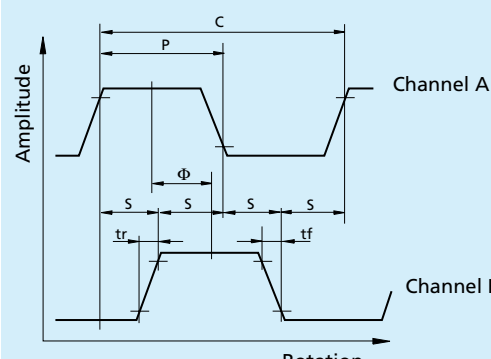
These incremental shaft encoders in combination with the FAULHABER DC-Micromotors are designed for indication and control of both, shaft velocity and direction of rotation as well as for positioning.

Solid state Hall sensors and a low inertia magnetic disc provide two channels with 90° phase shift.

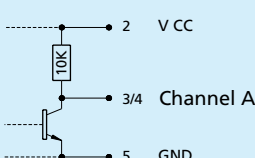
The supply voltage for the encoder and the DC-Micromotor as well as the two channel output signals are interfaced with a 150 mm ribbon cable and a 10-pin connector.

Details for the DC-Micromotors and suitable reduction gearheads are on separate catalogue pages.

Output signals / Circuit diagram / Connector information

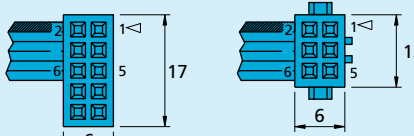


Output signals
with clockwise rotation as seen from the shaft end



Output circuit

Connectors



Standard 10P
(Panduit 050-010-455)

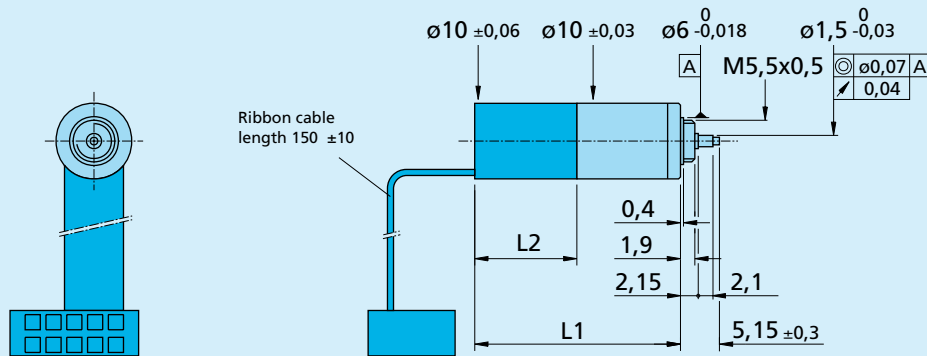
Option 6P
(FCI Quickie IDC 71601-106)

Pin Function

- 1 Motor +
- 2 V_{CC}
- 3 Channel A
- 4 Channel B
- 5 GND
- 6 Motor -
- 7 -
- 8 -
- 9 -
- 10 -

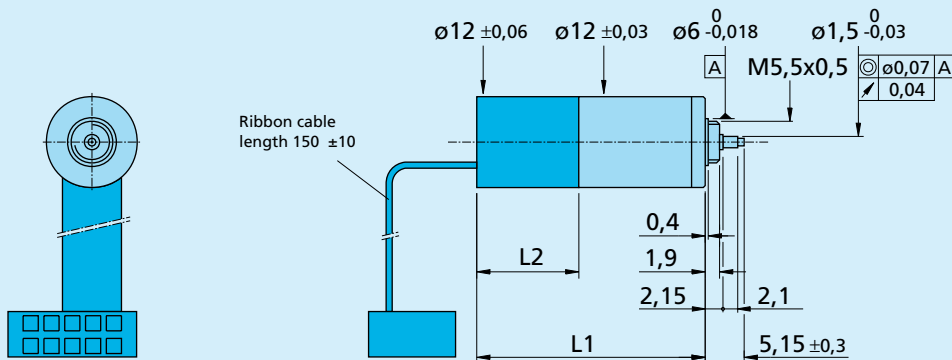
Ribbon cable
PVC - 6 conductors
0,09 mm² / 28 AWG

DC-Micromotors 1016 N ... G - K380, 1024 N ... S - K380 with Encoder 30B19



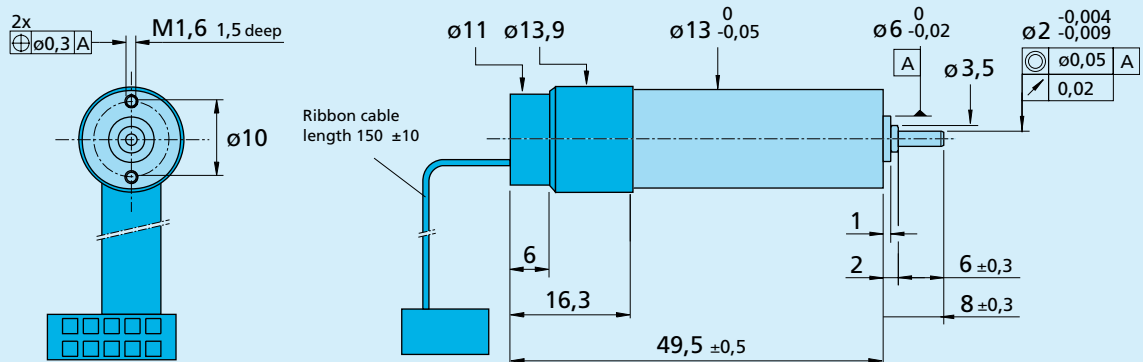
Motor type	L1	L2
1016	27,2	13,5
1024	35,2	13,5

DC-Micromotors 1219 N ... G - K380, 1224 N ... S - K380 with Encoder 30B20



Motor type	L1	L2
1219	30,2	13,5
1224	33,7	11,7

DC-Micromotor 1336 U ... C - 123 with Encoder 30B18



Planetary Gearheads

0,1 Nm

For combination with (overview on page 14-15)
DC-Micromotors:
1016, 1024, 1219, 1224

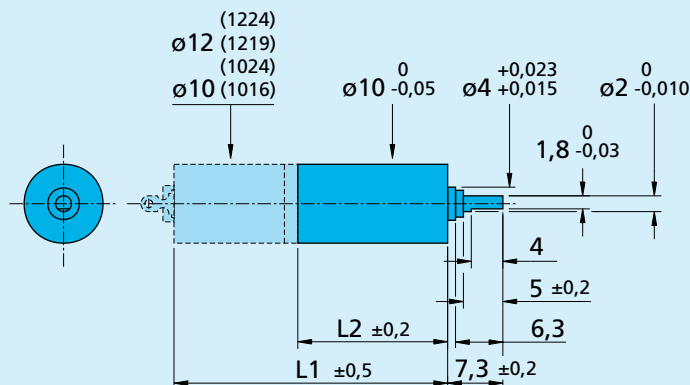
Series 10/1

	10/1	10/1 K
Housing material	metal	metal
Geartrain material	all steel	all steel
Recommended max. input speed for:		
– continuous operation	5 000 rpm	5 000 rpm
Backlash, at no-load	≤ 3°	≤ 3°
Bearings on output shaft	sintered sleeve bearings	preloaded ball bearings
Shaft load, max.:		
– radial (5 mm from mounting face)	≤ 1 N	≤ 7 N
– axial	≤ 2 N	≤ 5 N ¹⁾
Shaft press fit force, max.	≤ 10 N	≤ 5 N ¹⁾
Shaft play (on bearing output):		
– radial	≤ 0,03 mm	≤ 0,02 mm
– axial	≤ 0,10 mm	= 0 mm ¹⁾
Operating temperature range	– 30 ... + 100 °C	– 30 ... + 100 °C

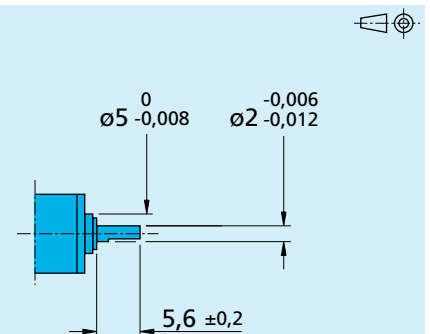
Specifications

reduction ratio	weight without motor	length without motor L2	length with motor				output torque		direction of rotation (reversible)	efficiency
			1016 M L1 mm	1024 M L1 mm	1219 M L1 mm	1224 M L1 mm	continuous operation M max. mNm	intermittent operation M max. mNm		
4:1	g	9,7	25,4	33,4	28,4	33,9	5	200	=	90
16:1	7	12,8	28,5	36,5	31,5	37,0	15	200	=	80
64:1	8	15,9	31,6	39,6	34,6	40,1	54	200	=	70
256:1	10	19,0	34,7	42,7	37,7	43,2	100	200	=	60
1 024:1	11	22,1	37,8	45,8	40,8	46,3	100	200	=	55
4 096:1	13	25,2	40,9	48,9	43,9	49,4	100	200	=	48

¹⁾ Limited by the preloaded ball bearings.
A higher axial load negates the preload.



10/1



10/1 K
L1, L2 = + 1